PF030039 (JP2001119607) ON 7686

(19) Patent Agency of Japan (JP)
(12) Official report on patent publication (A)
(11) Publication number: 2001-119607
(43) Date of publication of application: 27.04.2001
(51) Int.Cl. H04N 5/073 G09G 5/00 G09G 5/18 H04N 5/265 H04N 5/268
(21) Application number: 11-297741
(22) Date of filing: 20.10.1999
(71) Applicant: NEC Corp
(72) Inventor: Hashimoto Nagatake
(54) Title of the invention: automatic phase adjusting device

(57) Abstract:
Problem to be solved: To provide an automatic phase adjusting device that quickly executes phase adjustment of a plurality of image signals.
Solution: This automatic phase adjusting device is provided with a reference phase storage section (52), that stores a reference phase signal generated by a horizontal synchronizing signal of a reference video signal, a phase comparison section (54) that compares the reference phase signal stored in the reference phase storage section (52) with a comparison phase signal generated on the basis of the horizontal synchronizing signal of the reference video signal, and a phase analysis section (55) that generates phase difference data to control the phase of the comparison video signal, on the basis of the result of comparison.

RCA/ A D PF030039
CITED BY APPLICANT

[Claims]

[Claim 1]

The reference phase storage section that stores the reference phasing signal generated based on the horizontal synchronizing signal of a reference video signal, to the extent that the comparison phasing signal generated based on the mentioned above reference phasing signal stored by the mentioned above reference phase storage section and the horizontal synchronizing signal of a comparison video signal is compared, a phase comparison section, automatic phase control device equipped with the phase analysis section that generates the phase contrast data that control the phase of the mentioned above comparison video signal based on the result of the mentioned above comparison.

[Claim 2]

The automatic phase control device with which the mentioned above reference phasing signal consists of a reference horizontal synchronization phasing signal and the mentioned above comparison phasing signal consists of a comparison horizontal synchronization phasing signal in automatic phase control device according to claim 1.

[Claim 3]

The reference phase storage section that stores the reference phasing signal generated based on the horizontal synchronizing signal and color synchronizing signal of a reference video signal, to the extent that the comparison phasing signal generated based on the mentioned above reference phasing signal stored by the mentioned above reference phase storage section and the horizontal synchronizing signal and color synchronizing signal of a

comparison video signal is compared, a phase comparison section, automatic phase control device equipped with the phase analysis section that generates the phase contrast data that control the phase of the mentioned above comparison video signal based on the result of the mentioned above comparison.

[Claim 4]

The automatic phase control device with which the mentioned above reference phasing signal consists of a reference horizontal synchronization phasing signal and a reference color phasing signal and the mentioned above comparison phasing signal consists of a comparison horizontal synchronization phasing signal and a comparison color phasing signal in automatic phase control device according to claim 3.

[Claim 5]

The reference phase storage section that stores the reference phasing signal generated based on the horizontal synchronizing signal, vertical synchronizing signal and color synchronizing signal of a reference video signal, to the extent that the comparison phasing signal generated based on the mentioned above reference phasing signal stored by the mentioned above reference phase storage section and the horizontal synchronizing signal, vertical synchronizing signal and color synchronizing signal of a comparison video signal is compared, a phase comparison section, automatic phase control device equipped with the phase analysis section that generates the phase contrast data that control the phase of the mentioned above comparison video signal based on the result of the mentioned above comparison.

[Claim 6]
The automatic phase control device with which the mentioned above reference phasing signal consists of a reference horizontal synchronization phasing signal, a reference vertical-synchronization phasing signal and a comparison color phase simulation signal and the mentioned above comparison phasing signal consists of a comparison horizontal synchronization phasing signal, a comparison vertical-synchronization phasing signal and a comparison color phase simulation signal in automatic phase control device according to claim 5.
[Claim 7]
The automatic phase control device with which it has the comparison phase storage section that stores the mentioned above comparison phasing signal in phase adjustment device according to claims 1 - 6, and a phase comparison section compares at least for the above the mentioned above reference phasing signal with which the mentioned above reference phase storage section stored with the mentioned above comparison phasing signal stored by the mentioned above comparison phase storage section.
[Claim 8]
The automatic phase control device with which the mentioned above reference video signal consists of a reference black burst signal and the mentioned above comparison video signal consists of a comparison black burst signal in automatic phase control device according to claims 1 - 7.

[Detailed description of the invention]

[0001]

[Field of the invention] This invention relates to the automatic phase control device that synchronizes the phase of several video signals.

[0002]

[Description of the prior art] The activity of editing a video signal includes the processing that compounds several video signals. A video signal has the proper phase. A synchronization of the phase of several video signals changes the edited video signal smoothly. An image edit system performs processing that compounds several images.

[0003] Drawing 3 shows the conventional image edit system. The image edit system 1 shown on drawing is equipped with a synchronizing signal generator 10, the image switcher 11, a video distribution amplifier 12, phase detection device 13, supervisory device 14 and the 1st - n-th material generation source 15-1 - 15-n.

[0004] A synchronizing signal generator 10 is connected with the image switcher 11 and phase detection device 13 at the 1st - n-th material generation source 15-1 - 15-n. The image switcher 11 is connected to a video distribution amplifier 12 and phase detection device 13. A video distribution amplifier 12 is connected to phase detection device 13 and the external device that is not represented. Phase detection device 13 is connected to supervisory device 14. The 1st - n-th material generation source 15-1 - 15-n are connected to the image switcher 11.

[0005] A synchronizing signal generator 10 is a circuit that generates a reference black burst signal. A reference black burst signal consists of reference horizontal synchronizing signal RH, reference vertical synchronizing signal RV and a reference color subcarrier (subcarrier) RSC. This reference black burst signal is generated based on the picture signal used as the reference of the image edit system 1 of operation.

[0006] A synchronizing signal generator 10 outputs the 1st clock signal C1 towards phase detection device 13. A synchronizing signal generator 10 outputs the 2nd clock signal C2 towards the 1st - n-th material generation source 15-1 - 15-n. A synchronizing signal generator 10 outputs the reference (black burst BB) signal BB0 towards the image switcher 11. The contents of the 1st clock signal C1 and the 2nd clock signal C2 are the same as the contents of the reference black burst signal BB0. In phase detection device 13 and the 1st - 2nd material generation source 15-1 - 15-n, the signal outputted from a synchronizing signal generator 10 is used for adjustment of timing of operation. Thus, the name with which the contents differ to the same signal was given.

[0007] The 1st material generation source 15-1 outputs the 1st comparison BB signal BB1. The 2nd material generation source 15-2 outputs the 2nd comparison BB signal BB2. The 3rd material generation source 15-3 outputs the 3rd comparison BB signal BB3. n-th material generation source 15-n outputs the n-th comparison BB signal BBn. The 1st - the n-th comparison BB signals BB1-BBn consist of comparison horizontal synchronizing signal CH, comparison vertical synchronizing signal CV

and a comparison color subcarrier CSC. These 1st - n-th comparison BB signals BB1-BBn are video signals that show the material of the image compounded to a reference video signal. The 1st the n-th material generation source 15-1 - 15-n have the equalization circuit that adjusts the phase of a comparison horizontal synchronizing signal, a comparison vertical synchronizing signal and a comparison color subcarrier signal manually.

[0008] The image switcher 11 is a switcher circuit that chooses and outputs the reference BB signal BB0 and the 1st - n-th comparison BB signals BB1-BBn.

A video distribution amplifier 12 is a switcher circuit that switches the output destination change that outputs BB signal based on directions of phase detection device 13. Phase detection device 13 generates a reference level phasing signal, a reference perpendicular phasing signal and a reference color phasing signal from the horizontal synchronizing signal, vertical synchronizing signal and color subcarrier signal of the reference BB signal BB0. Phase detection device 13 generates a comparison level phasing signal, a comparison perpendicular phasing signal, and a comparison color phasing signal from the horizontal synchronizing signal of the 1st - n-th comparison BB signals BB1-BBn, a vertical synchronizing signal and a color subcarrier signal.

A supervisory circuit 14 is a display that consists of a waveform monitor and a vector scope. A waveform monitor displays a reference level phasing signal, a reference perpendicular phasing signal, a comparison level phasing signal and a comparison perpendicular phasing signal.

A vector monitor displays a reference color phasing signal and a comparison color phasing signal.

[0009] The synchronization of the phase of the reference BB signal BB0 and the phase of the 1st - n-th comparison BB signals BB1-BBn is adjusted manually. The contents of a display of supervisory device 14 are recognized by the user. A user operates the equalization circuit of the 1st - n-th material generation sources BB1-BBn with reference to the contents of a display of supervisory device 14.

[0010] The technique of adjusting the phase of a video signal is specified in JP 10-23299 A and JP 11-4360 A. The technique in which the phase adjustment width of face expected is preliminary set in these official reports is indicated.

[0011]

[Problems to be solved by the invention] Phase adjustment of the 1st - n-th material generation source 15-1 - 15-n is manually performed by the operator. The actuation in which the manual regulation of a phase became skillful is needed. The manual regulation of a phase is performed when an image edit system is installed. The manual regulation of a phase is performed when the source of a signal of the reference BB signal BB0 or the 1st - n-th comparison BB signals BB1-BBn is changed. The manual regulation of a phase cannot be completed quickly. If the manual regulation of a phase is not completed quickly, operation initiation of the installed image edit system will be overdue.

If phase manual regulation is not completed quickly, the resumption of operation after source modification of a signal will be overdue.

[0012] This invention offers the automatic phase control device with which phase adjustment of several picture signals is performed quickly.

[0013]

[Means for solving the problem] The reference phase storage section that stores the reference phasing signal with which the table retrieval device according to this invention was generated b ased on the horizontal synchronizing signal of a reference video signal (52), it has the phase analysis section (55) that generates the phase contrast data that control the phase of a comparison video signal with a phase comparison section (54) based on the result of a comparison to the extent that the comparison phasing signal generated based on the reference phasing signal stored by the reference phase storage section (52) and the horizontal synchronizing signal of a comparison video signal is compared.

[0014] As for other table retrieval devices by this invention, a reference phasing signal consists of a reference horizontal synchronization phasing signal.

As for other table retrieval devices by this invention, a comparison phasing signal consists of a comparison horizontal synchronization phasing signal.

[0015] The reference phase storage section that stores the reference phasing signal with which other table retrieval devices according to this invention were generated based on the horizontal synchronizing signal and color synchronizing signal of a reference video signal (52),

to the extent that the comparison phasing signal generated based on the reference phasing signal stored by the reference phase storage section (52) and the horizontal synchronizing signal and color synchronizing signal of a comparison video signal is compared, a phase comparison section (54), based on the result of the comparison, it has the phase analysis section (55) that generates the phase contrast data that control the phase of a comparison video signal.

[0016] A reference phasing signal consists of a reference horizontal synchronization phasing signal and a reference color phasing signal, and as for other table retrieval devices according to this invention, a comparison phasing signal consists of a comparison horizontal synchronization phasing signal and a comparison color phasing signal.

[0017] The reference phase storage section that stores the reference phasing signal with which other table retrieval devices according to this invention were generated based on the horizontal synchronizing signal, vertical synchronizing signal and color synchronizing signal of a reference video signal (52), to the extent that the comparison phasing signal generated based on the reference phasing signal stored by the reference phase storage section (52), and the horizontal synchronizing signal, vertical synchronizing signal and color synchronizing signal of a comparison video signal is compared, a phase comparison section (54), based on the result of a comparison, it has the phase analysis section (55) that generates the phase contrast data that control the phase of a comparison video signal.

[0018] A reference phasing signal consists of a reference horizontal synchronization phasing signal, a reference vertical-synchronization phasing signal and a comparison color phase simulation signal, and as for other table retrieval devices according to this invention, a comparison phasing signal consists of a comparison horizontal synchronization phasing signal, a comparison vertical-synchronization phasing signal and a comparison color phase simulation signal.
[0019] Other table retrieval devices according to this invention are equipped with the comparison phase storage section (54) that stores a comparison phasing signal and a phase comparison section (55) compares the reference phasing signal stored by the reference phase storage section (52) with the comparison phasing signal stored by the comparison phase storage section.
[0020] A reference video signal consists of a reference black burst signal, and as for other table retrieval devices according to this invention, a comparison video signal consists of a comparison black burst signal.
[0021]
[Embodiment of the invention] Drawing 1 shows the image edit system according to this invention. The image edit system 2 shown on drawing is equipped with a synchronizing signal generator 20, the image switcher 21, a video distribution amplifier 22, automatic phase control device 23, and the 1st - n-th material generation source 24-1 - 24-n.
[0022] A synchronizing signal generator 20 is connected with the image switcher 21 and automatic phase control device 23 at the 1st - n-th material generation source 24-1

- 24-n. The image switcher 21 is connected to a video distribution amplifier 22 and automatic phase control device 23. A video distribution amplifier 22 is connected to automatic phase control device 23 and the external device that is not represented. Automatic phase control device 23 is connected to the 1st - n-th material generation source 24-1 - 24-n. The 1st - n-th material generation source 24-1 - 24-n are connected to the image switcher 11.

[0023] A synchronizing signal generator 20 is a circuit that generates a reference black burst (BB) signal. A reference black burst signal consists of reference horizontal synchronizing signal RH, reference vertical synchronizing signal RV and a reference color subcarrier (subcarrier) RSC. This reference black burst signal is generated based on the picture signal used as the reference of the image edit system 2 of operation.

[0024] A synchronizing signal generator 20 outputs the 1st clock signal C1 towards automatic phase control device 23. A synchronizing signal generator 20 outputs the 2nd clock signal C2 towards the 1st - n-th material generation source 24-1 - 24-n. A synchronizing signal generator 20 outputs the reference (black burst BB) signal BB0 towards the image switcher 21. The contents of the 1st clock signal C1 and the 2nd clock signal C2 are the same as the contents of the reference black burst signal BB 0. In automatic phase control device 23 and the 1st - the 2nd material generation source 24-1 - 24-n, the signal outputted from a synchronizing signal generator 20 is used for adjustment of timing of operation. Thus, the name with which the contents differ to the same signal was given.

[0025] The 1st material generation source 24-1 outputs the 1st comparison BB signal BB1. The 2nd material generation source 24-2 outputs the 2nd comparison BB signal BB2. The 3rd material generation source 24-3 outputs the 3rd comparison BB signal BB3. The n-th material generation source 24-n outputs the n-th comparison BB signal BBn. The 1st - n-th comparison BB signals BB1-BBn consist of comparison horizontal synchronizing signal CH, comparison vertical synchronizing signal CV and a comparison color subcarrier CSC. These 1st - n-th comparison BB signals BB1-BBn are video signals that show the material of the image compounded to a reference video signal.
[0026] The 1st - n-th material generation source 24-1 - 24-n have the equalization circuit that adjusts the phase of a comparison horizontal synchronizing signal, a comparison vertical synchronizing signal and a comparison color subcarrier signal manually.
[0027] The image switcher 21 is a switcher circuit that chooses and outputs the reference BB signal BB0 and the 1st - n-th comparison BB signals BB1-BBn. A video distribution amplifier 22 is a switcher circuit that switches the output destination change that outputs BB signal based on directions of automatic phase control device 23. Automatic phase control device 23 generates a reference level phasing signal, a reference perpendicular phasing signal and a reference color phasing signal from the horizontal synchronizing signal, vertical synchronizing signal and color subcarrier signal of the reference BB signal BB0.

Automatic phase control device 23 generates a comparison level phasing signal, a comparison perpendicular phasing signal and a comparison color phasing signal from the horizontal synchronizing signal of the 1st - n-th comparison BB signals BB1-BBn, a vertical synchronizing signal and a color subcarrier signal. Automatic phase control device 23 generates phase contrast data based on these phasing signals. The phase contrast data is used for the phase adjustment of the comparison BB signals BB1-BBn outputted from the 1st - n-th material generation source 24-1 - 24-n.

[0028] Drawing 2 shows the configuration of the automatic phase control device according to this invention. The automatic phase control device 23 shown on drawing is equipped with the phase detecting element 51, the reference phase storage section 52, the comparison phase storage section 53, the phase comparison section 54, the phase analysis section 55, the phase data output section 56, the data change section 57 and the status incorporation section 58.

[0029] The main track video signal outputted from the video distribution amplifier 22 inputs into the phase detection 51. The output of the phase detecting element 51 is connected to the reference phase storage section 52 and the comparison phase storage section 53.

The output of the reference phase storage section 52 is connected to the phase comparison section 54. The output of the comparison phase storage section 53 is connected to the phase comparison section 54. The output of the phase comparison section 54 is connected to the phase analysis section 55.

The output of the phase analysis section 55 is connected to the phase contrast data output section 56. The output of the phase contrast data output section 56 is connected data change section 57. The output of the data change section 57 is connected to the 1st - n-th material generation source 24-1 - 24-n. The output of the status incorporation section 58 is connected to the data change section 57.
The image switcher 21 connects with the input of the status incorporation section 58. The system control panel 30 connects with the image switcher 21.
[0030] The phase detecting element 51 generates a reference level phasing signal, a reference perpendicular phasing signal and a reference color phasing signal from the horizontal synchronizing signal, vertical synchronizing signal and color subcarrier signal of the radical reference BB signal BB0. Automatic phase control device 23 from the 1st of the 1st - n-th comparison BB signals BB1-BBn n-th horizontal synchronizing signal HS1-HSn, the 1st - n-th vertical synchronizing signal VS1-VSn, and the 1st - n-th color subcarrier signals CS1-CSn. The 1st - n-th comparison level phasing signals CH1-CHn, the 1st - n-th comparison perpendicular phasing signals CV1-CVn and the 1st - n-th comparison color phasing signals CC1-CCn are generated. The phase detecting element 51 is a detector circuit.
[0031] The reference phase storage section 52 stores the reference level phasing signal RH, the reference perpendicular phasing signal RV and the reference color phasing signal RC. The reference phase storage section 52 consists of a store circuit that can rewrite the contents of storage.

The comparison phase storage section 52 stores the 1st - n-th comparison level phasing signals CH1-CHn, the 1st - n-th comparison perpendicular phasing signals CV1-CVn and the 1st - n-th comparison color phasing signals CC1-CCn. The comparison phase storage section 53 consists of a store circuit that can rewrite the contents of storage.

[0032] The phase comparison section 54 detects the difference of the reference level phasing signal RH and the comparison phase storage section 53 that were stored by the reference phase storage section 52, the 1st - n-th comparison level phasing signals CH1-CHn. The phase comparison section 54 detects the difference of the reference perpendicular phasing signal RV and the comparison phase storage section 53 that were stored by the reference phase storage section 52, the 1st - n-th comparison perpendicular phasing signals CV1-CVn. The phase comparison section 54 detects the difference of the reference color phasing signal RC and the comparison phase storage section 53 that were stored by the reference phase storage section 52, 1st - n-th comparison color phasing signals CC1-CCn.

[0033] The phase analysis section 55 is the processor that computes the direction and amount of a phase shift based on 3 difference data (a horizontal, a vertical, color).

The phase analysis section 55, when difference data show phase coincidence, phase contrast data are not generated.

The phase analysis section 55, when difference data show phase lag, the phase contrast data that shows directions of phase delivery and its amount are generated.

The phase analysis section 55, when difference data show a phase lead lag network, the phase contrast data that

shows directions of phase return and its amount are generated.

[0034] The phase contrast data output section 56 is a buffer circuit. The phase contrast data output section 56 outputs the 1st phase contrast data and the 2nd phase contrast data to the output timing of the data change section. The 1st phase contrast data and the 2nd phase contrast data are outputted to the 1st - n-th material generation source 24-1 - 24-n as phase contrast data S2.

[0035] The data switcher 57 is a switcher that sets up the output destination change of phase contrast data.

The data switcher 57 chooses 1st - n-th output S2-1 - S2-n based on the control signal outputted from the status incorporation section 58. The control signal shows the 1st - n-th condition. The case where the control signal shows the 1st condition, the data switcher 57 chooses the 1st output S2-1. The case where the control signal shows the 2nd condition, the data switcher 57 chooses the 2nd output S2-2. When the control signal shows the n-th condition, the data switcher 57 chooses n-th output S2-n.

[0036] The status incorporation section 58 accepts a status signal S1 (drawing 1) from the image switcher 21.

A status signal S1 shows the input that the image switcher 21 is choosing. The status incorporation section 58 outputs the change signal corresponding to status signal S1 contents. The change signal is set as the 1st condition, while the image switcher 21 chooses the 1st material generation source 24-1. The change signal is set as the 2nd condition, while the image switcher 21 chooses the 2nd material generation source 24-2. As for the change signal, the image switcher 21 is set as the n-th condition

during selection in n-th material generation source 24-n. The case where a change signal shows the 1st condition, the 1st output S2-1 is set up effectively. The case where a change signal shows the 2nd condition, the 2nd output S2-2 is set up effectively. When a change signal shows the n-th condition, n-th output S2-n is set up effectively.

[0037] The system control panel 30 consists of an actuation switcher that the user of the image edit system 2 operates. A system control panel outputs selection information. The selection information shows the 1st used for image edit processing the n-th material generation source 24-1 - 24-n. The image switcher 21 chooses the 1st - n-th material generation source 24-1 - 24-n based on selection information.

[0038] With reference to drawing 1 and drawing 2, actuation of the automatic phase control device 23 according to this invention is explained.

[0039] Processing 1: If the image edit system 2 starts, a synchronizing signal generator 20 will output the reference BB signal BB0 and the 1st and 2nd clock signals C1 and C2. A system switcher 21, automatic phase control device 23 and the 1st - n-th material generation source 24-1 - 24-n operate synchronously.

[0040] Processing 2: The image switcher 21 outputs the reference BB signal BB0 to acceptance and a video distribution amplifier 22.

[0041] Processing 3: A video distribution amplifier 22 outputs the reference BB signal BB0 to automatic phase control device 23.

[0042] Processing 4: The phase detecting element 51 of automatic phase control device 23 generates a reference

level phasing signal, a reference perpendicular phasing signal and a reference color phasing signal from the horizontal synchronizing signal, vertical synchronizing signal, and color subcarrier signal of the radical reference BB signal BB0. The reference level phasing signal and reference perpendicular phasing signal that were generated and a reference color phasing signal are stored by the reference phase storage section 52.

[0043] Processing 5: If storage of a reference level phasing signal, a reference perpendicular phasing signal and a reference color phasing signal is completed, the image switcher 21 will choose the 1st material generation source 24-1. The image switcher 21 outputs the 1st comparison BB signal BB1 to a video distribution amplifier 22.

[0044] Processing 6: A video distribution amplifier 22 outputs the 1st comparison BB signal BB1 to automatic phase control device 23.

[0045] Processing 7: The phase detecting element 51 of automatic phase control device 23 generates a comparison level phasing signal, a comparison perpendicular phasing signal, and a comparison color phasing signal from the horizontal synchronizing signal, vertical synchronizing signal and color subcarrier signal of the 1st comparison BB signal BB1. The comparison level phasing signal and comparison perpendicular phasing signal that were generated and a comparison color phasing signal are stored by the comparison phase storage section 52.

[0046] Processing 8: The phase comparison section 54, when storage of the comparison phase storage section 53 completes, compares the reference level phasing signal

stored by the reference phase storage section 52 with the comparison level phasing signal stored by the comparison phase storage section 53. The phase comparison section 54 compares the reference perpendicular phasing signal stored by the reference phase storage section 52 with the comparison perpendicular phasing signal stored by the comparison phase storage section 53. The phase comparison section 54 compares the reference color phasing signal stored by the reference phase storage section 52 with the comparison color phasing signal stored by the comparison phase storage section 53. The result of a comparison is outputted to the phase analysis section 55 as 3 difference data.

[0047] Processing 9: The phase analysis section 55 analyzes 3 difference data and a phase shift is detected, phase contrast data are generated. Phase contrast data are outputted to the phase contrast data output section 56.

[0048] Processing 10: The status incorporation section 58 detects selection of the 1st material generation source 24-1 by the image switcher 21. The status incorporation section 58 sets a change signal as the 1st condition. The data change section 57 sets up output S2-1 effectively.

[0049] Processing 11: The phase contrast data output section 56, the 1st output of the data change section 57 through S2-1, phase contrast data are outputted to the 1st material generation source 24-1.

[0050] Processing 12: The 1st material generation source 24-1 adjusts the phase of the picture signal corresponding to the comparison BB signal BB0 based on phase contrast data.

[0051] Next, processing 5 - processing 11 are performed to the 2nd material generation source 24-2 - n-th material generation source 24-n. Completion of the processing to n-th material generation source 24-n synchronizes the picture signal corresponding to the reference BB signal BB0, and the picture signal corresponding to the 1st - n-th comparison BB signals BB1-BBn. When a phase is not in agreement by processing of one process, processing 5 - processing 11 are carried out.

[0052] The phase comparison section 54 stores temporarily a comparison level phasing signal, a comparison perpendicular phasing signal and a comparison color phasing signal. In this case, the comparison phase storage section 53 is removed from automatic phase control device 23.

[0053] In the example, the explanation that refers to a level phasing signal, a perpendicular phasing signal and a color phasing signal was made. The referred signal is not concerned only with a level phasing signal. The referred signal may combine a level phasing signal and a color phasing signal.

[0054]

[Effect of the invention] The automatic phase control device according to this invention can detect the phase shift of a picture signal automatically, and can carry out automatic adjustment of the phase shift. The manual activity that adjusts a phase shift is unnecessary.

The time amount that adjustment of a phase shift takes can be shortened rather than the time amount that is required in a manual activity. According to the level of skill of operator, an adjustment error produces a manual

activity. Adjustment precision with fixed automatic adjustment is always acquired.

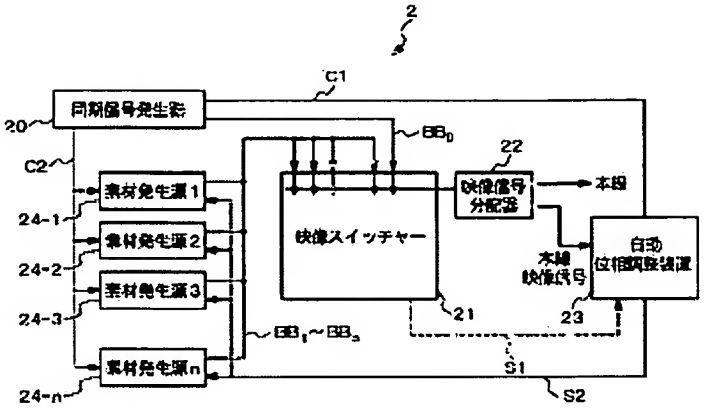
[Brief description of the drawings]

[Drawing 1] shows the image edit system according to this invention.
[Drawing 2] shows the automatic phase control device according to this invention.
[Drawing 3] shows the conventional image edit system.

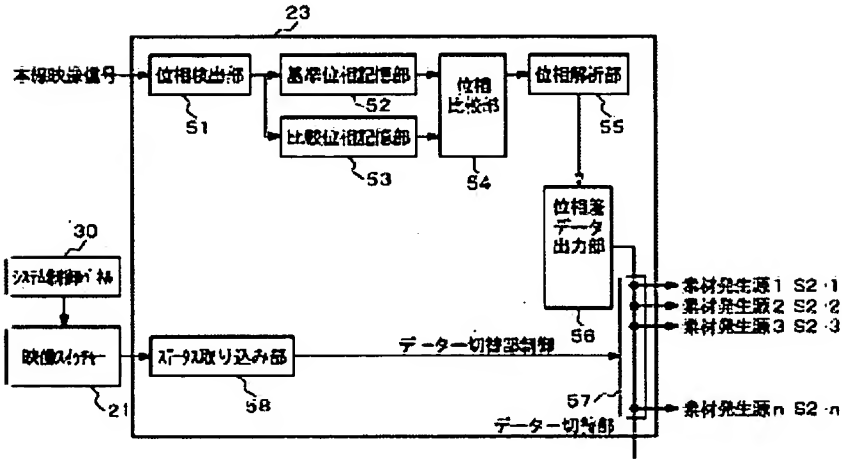
[Description of notations]

2: Image edit system
20: Synchronizing signal generator
21: Image switcher
22: Video distribution amplifier
23: automatic phase control device
24-1 - 24-n: 1st - n-th material generation source
51: Phase detecting element
52: Reference phase storage section
53: Comparison phase storage section
54: Phase comparison section
55: Phase analysis section
56: Phase contrast data output section
57: Data change section
58: Status incorporation section

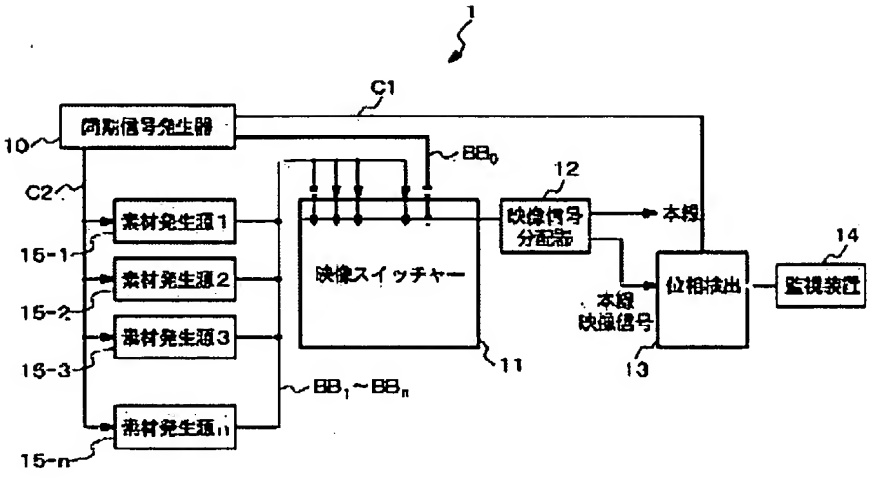
Drawing 1



Drawing 2



Drawing 3


1
C1
同期信号発生器
10
BB0
12
C2
素材発生源1
15-1
素材発生源2
15-2
素材発生源3
15-3
素材発生源n
15-n
映像スイッチャー
11
BB1~BBn
映像信号分配器
本線
14
位相検出
監視装置
本線映像信号
13

(19) Patent Agency of Japan (JP)
(12) Official report on patent publication (A)
(11) Publication number: 9-037141
(43) Date of publication of application: 07.02.1997
(51) Int.Cl. H04N 5/232 H04N 5/073 H04N 5/262
(21) Application number: 7-182922
(22) Date of filing: 19.07.1995
(71) Applicant: Hitachi LTD
(72) Inventor: Takasugi Hajime, Yamashita Kazuya
(54) Title of the invention: Video processing system
(57) Abstract:

Problem to be solved: To provide in-phase video signals from mutually separately positioned plural video cameras.
Solution: A video camera driving device 22 respectively controls synchronizing control pulse signals PH1-PH4 to be applied to the respective video cameras for generating the other video signals so that the phase of the other video signal can be matched with one of plural video signals V1-V4 inputted from plural video cameras 1-4. Thus, the deviation of phases among the respective video signals caused by the difference in the lengths of signal cables to the respective video cameras is eliminated.

[Claims]

[Claim 1] The image processing system characterized by establishing the video camera driving means that generates the synchronous control signal that controls these other video cameras so that the phase of the synchronizing signal of the video signal that comes to the

synchronizing signal of the video signal that comes to one video camera from other video cameras in the image processing system that includes the video signal from several video cameras located in the mutually distant location, and is processed synchronously in agreement.

[Claim 2] The mentioned above video camera driving means of the image processing system according to claim 1 characterized by generating the mentioned above synchronous control signal, so that it may become in phase with the synchronizing signal of the selected video signal,

a selection means to choose one of several of the video signals as a criteria video signal, a phase simulation control pulse generating means corresponding to each video camera that generates the synchronous control signal given to several video cameras. The mentioned above phase simulation control pulse generating means generating the synchronizing signal of the video signal that comes from a corresponding video camera, the mentioned above selection means.

[Claim 3] The image processing system according to claims 1 or 2characterized by having an image-processing means to process several video signals synchronously.

[Claim 4] The image processing system according to claim 3 characterized by having one monitor with which the mentioned above image-processing means displays the mentioned above several video signals.

[Claim 5] The image processing system characterized by including the video camera driving means that generates the synchronous control signal that controls these video cameras, so that the phase of the synchronizing signal of

the video signal that comes to the synchronizing signal of the video signal that comes to the mentioned above control center from one video camera in several video cameras installed in the mutually distant location and the image processing system equipped with the control center that incorporates a video signal via a signal cable and is processed synchronously from each video camera and from other video cameras is in agreement.

[Claim 6] The mentioned above video camera driving means of the image processing system according to the claim 5 characterized by generating the mentioned above synchronous control signal so that it may become in phase with the synchronizing signal of the selected video signal, a selection means to choose one of several of the video signals as a criteria video signal, a phase simulation control pulse generating means corresponding to each video camera that generates the synchronous control signal given to several video cameras, the mentioned above phase simulation control pulse generating means generating the synchronizing signal of the video signal that comes from a corresponding video camera..

[Claim 7] The mentioned above control center of the image processing system according to claims 5 or 6 characterized further by providing the image processing means to process several image signals from each video camera synchronously

[Claim 8] The image processing system according to claim 7 characterized by having one monitor with which the mentioned above image processing means displays the mentioned above several video signals.

[Detailed description of the invention]

[0001]

[Industrial application] This invention relates to the image processing system that processes the video signal acquired from several video cameras installed in a location that is separated mutually and is different synchronously, and especially relates to phase simulation control of each video signal.

[0002]

[Description of the prior art] An image processing system like the monitoring system that processes the video signal that comes from several video cameras installed in the mutually distant location has a demand of checking the video signal of several channels that comes from each video camera with one monitor, the video signal of several channels is switched by devices, such as a switcher or the system of displaying the image of several channels simultaneously by the quadrisection adapter is proposed. It is trying not to confuse the image that switches when these systems switch a channel by devices, such as a switcher, by doubling the synchronization between each channel with a video camera driving device. In order to specifically double the synchronization between several connected video cameras, it is trying to give a synchronization pulse to the same timing to the video camera of all channels in a video camera driving device.

[0003]

[Problems to be solved by the invention] But, if the synchronization pulse of the same timing is always outputted to the distance to the video camera of each channel connected to the video camera driving device to all channels between channels in that there is a difference etc., a phase shift will be generated between channels in the video signal of each channel outputted from each video camera by the difference in the time delay in the cable between a video camera driving device and a video camera.

[0004] Generally, if several 100 meter difference is in the length of a cable, the phase contrast for several microseconds will occur. Although there is no practical problem when this phase contrast carries out a channel switch simply at the interval for several seconds by devices, such as a switcher, in the case of the system configuration that incorporates and reads the image information of the inputted video signal to memory by the synchronous control like the frame switcher of a synchronous control or a quadrisection adapter, the phase contrast for several microseconds between channels becomes with the phase shift to the horizontal direction of image information as it is.

[0005] That is, if four sets of the video cameras 1-4 installed in the mutually distant location are connected to the video camera driving device 9 with signal cables 5-8 and the video signals V1-V4 of 4 channels corresponding to each video cameras 1-4 are outputted as shown on drawing 2, a phase shift will occur between each video signal. For example, a video camera 2 is in a distant

location to other video cameras 1, 3 and 4 and the phase of the video signal V2 in which the signal cable 6 between the video camera driving devices 9 comes to the video camera driving device 9 to other cables 5, 7 and 8 and is long, it becomes late for other video signals V1, V3 and V4. Thus, if the image information of several video signals V1-V4 with phase contrast is incorporated in memory to the same timing, in the worst condition, the blanking section of a video signal may go into the incorporated data and lack of image information will occur.

[0006] The purpose of this invention is for the video signal that comes to be in phase, and acquire it from several video cameras that are located and separated mutually.

[0007] In the image processing system that performs memory control of a synchronous control for the video signal transmitted from several video cameras that are separated and located mutually by the frame switcher, a quadrisection adapter, etc., other purposes of this invention is to prevent the phase shift of the video signal by the difference of the amount of signal delay by the difference in the signal cable length to each video camera and to enable it to incorporate image information correctly.

[0008] Also, the other purpose of this invention is in the image processing system that carries out the synchronous control of the video signal transmitted from several video cameras that separate mutually and are located by the frame switcher, a quadrisection adapter and is displayed on one monitor to prevent the phase shift of the video

signal by the difference of the amount of signal delay by the difference in the signal cable length to each video camera and realize stable image display.

[0009]

[The means for solving a problem] One description of this invention is in the image processing system that incorporates the video signal from several video cameras located in the mutually distant location, and is processed synchronous to have established the video camera driving means that generates the synchronous control signal that controls these other video cameras, so that the phase of the synchronizing signal of the video signal that comes to the synchronizing signal of the video signal that comes from one video camera from other video cameras is in agreement.

[0010] In several video cameras installed in the location that other descriptions of this invention left mutually and the image processing system equipped with the control center that incorporates a video signal and processes it synchronously via a signal cable from each video camera. It has the video camera driving means that generates the synchronous control signal that controls these other video cameras, so that the phase of the synchronizing signal of the video signal that comes to the synchronizing signal of the video signal that comes to one video camera from other video cameras is in agreement in the mentioned above control center.

[0011] Specifically, the mentioned above video camera driving means has a selection means to choose one of several video signals that come as a criteria video signal, the phase simulation control pulse generating means

corresponding to each video camera that generates the synchronous control signal given to several video cameras is established, the mentioned above phase simulation control pulse generating means, the synchronizing signal of the video signal that comes from a corresponding video camera, the mentioned above selection means is characterized by making it generate the mentioned above synchronous control signal, so that it may become in phase with the synchronizing signal of the selected video signal.

[0012] Moreover, it is characterized by that this image processing system is equipped with an image-processing means to process several video signals synchronously and this image-processing means is equipped with one monitor that displays the mentioned above several video signals.

[0013]

[Function] A video camera driving means controls the synchronous control signal over the video camera that generates these other video signals to match the phase of the other video signals to one of several video signals that come from several video cameras.

[0014] Thus, regardless of the length of the signal cable to a video camera, several video signals will be carried out with the same phase, and an image processing will become easy.

[0015]

[Example] Next, the example of this invention is explained with reference to a drawing.

[0016] Drawing 1 is the block diagram of the monitoring system that is one example of the image processing system according to this invention. Several video cameras 1-4 installed in the mutually distant location are connected to the video camera driving device 22 of the control center 21 by cables 5-8, respectively. Phase simulation control pulse generating means 23-26 to generate the synchronous control pulse signals PH1-PH4 for the video camera driving device 22 to perform phase simulation control to each video cameras 1-4, a criteria channel selection means 27 to choose from each video cameras 1-4 one of four video signals V1-V4 that comes as a criteria video signal VX, the horizontal synchronizing signal of the criteria video signal VX of the channel chosen with this criteria channel selection means 27 is extracted. The criteria synchronization pulse generation means 28 that generates this horizontal synchronizing signal and the criteria synchronization pulse signal PVX in phase, and is given to the mentioned above phase simulation term control pulse generating means 23-26 and a camera current supply means 29 to supply a power source to each video camera 1-4. 31 is the image-processing means installed in the control center 21, it includes each video signals V1-V4, performs the image processing of a synchronous control using a frame switcher, a quadrisection adapter, etc., and displays it on one monitor.

[0017] Each video cameras 1-4 generate video signals V1-V4 in the phase that synchronized with the mentioned above synchronous control pulse signals PH1-PH4 given via signal cables 5-8 from the phase simulation control pulse generating means 23-26.

[0018] The mentioned above phase simulation control pulse generating means 23-26, the phase control pulse generating circuit that can change independently the generating phase of the mentioned above synchronous control pulse signals PH1-PH4 that each generates, to the extent that the phase contrast of the horizontal synchronizing signal of the video signals V1-V4 that comes from each video cameras 1-4, and the mentioned above reference pulse signal PVX is detected, a phase comparator circuit has the phase control circuit that changes the generating phase of the mentioned above synchronous control pulse signals PH1-PH4, so that the mentioned above phase control pulse generating circuit may be controlled based on the comparison result in a phase comparator circuit and both phase contrast may be lost.

[0019] Next, the actuation of this monitoring system is explained. The criteria channel selection means 27 inputs the video signals V1-V4 that come from each connected video cameras 1-4, chooses one channel that serves as criteria from the inside, and gives it to the reference pulse generation means 10 by making the video signal into the criteria video signal VX. Here the selection approach of the criteria channel in the criteria channel selection means 27, for example, a criteria channel is chosen as a video camera 1, when video cameras 1-4 are connected. Thus, a criteria channel is chosen as a video camera 2 when video cameras 2-4 are connected and a criteria channel is chosen as a video camera 3 when video cameras 3 and 4 are connected, a criteria channel is switched in order of video cameras 1, 2, 3 and 4.

Thus, a video camera 1 is chosen as a criteria channel in this example. But, it is not especially limited that a video camera system is chosen as a criteria channel.

[0020] The reference pulse generation means 28 generates the horizontal synchronizing signal of this criteria video signal VX, and the reference pulse signal PVX in phase based on the criteria video signal VX (= V1) outputted from the criteria channel selection means 27, and gives them to the phase simulation control pulse generating means 23-26. In this case, the phase simulation control pulse generating means 23 of the criteria channel used as the foundation of this reference pulse signal PVX ignores the mentioned above reference pulse signal PVX, generates synchronous control pulse signal PH1 in a free run, and sends it to a video camera 1. And other phase simulation control pulse generating means 24-26 change the generating phase of each synchronous control pulse signals PH2-PH4 given to each video cameras 2-4, so that the horizontal synchronizing signal of the video signals V2-V4 may serve as a phase that was in agreement with the mentioned above reference pulse signal PVX from each video cameras 2-4, respectively.

That is, the phase simulation control pulse generating means 24-26 control the generating phase of each synchronous control pulse signals PH2-PH4 to each video cameras 2-4, so that the phase of the video signals V2-V4 that is outputted to the phase of the video signal V1 that is outputted from the video camera 1 of a criteria channel, and come to the video camera driving device 22 from other video cameras 2-4 and come to this video camera driving device 22 is in agreement.

[0021] Thus, even if the amounts of delay of the signal that difference is in the length of the signal cable that connects between each video cameras 1-4 with the video camera driving device 22, and comes to this video camera driving device 22 differ, this video camera driving device 22 can acquire several video signals V1-V4 with the equal phase between each channel.

The image-processing means 31 equipped with the device that performs memory control of the frame switcher of a synchronous control, a quadrisection adapter, etc. synchronous by this can incorporate several video signals V1-V4 with the embodiment that is easy to process, and the stable image processing becomes possible.

[0022]

[Effect of the invention] To match the phase of other video signals to one of several video signals that come from several video cameras, controlling the synchronous control signal of other video cameras that generate the video signal, thus, regardless of the length of the signal cable to a video camera, several video signals will be carried out with the same phase, and an image processing will become easy.

[0023] And the stable display is achieved when displaying several of these video signals on one monitor.

[Brief description of the drawings]

[Drawing 1] is the block diagram showing one example of the monitoring system according to this invention.

[Drawing 2] is the circuit block and video signal wave form chart that explains the phase contrast of the video signal between several channels by the difference of the signal cable length to a video camera.

[Description]

1-4... video camera,

5-8... signal cable,

21... control center,

22... video camera driving device,

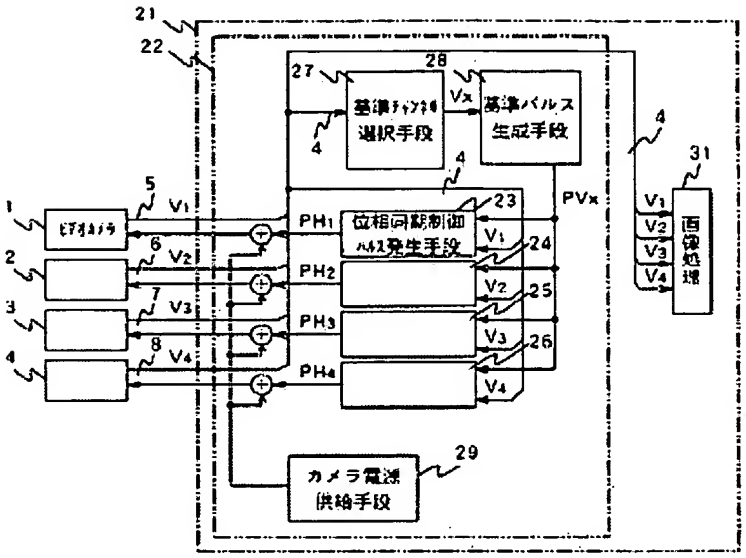
23-26... phase simulation control pulse generating means,

27... criteria channel selection means,

28... reference pulse generation means,

31...image-processing means.

Drawing 1



Drawing 2